

MEDICATION THERAPY AT DISCHARGE AND MEDICAL FOLLOW-UP: OUTCOMES
FOLLOWING SURGICAL CORONARY REVASCULARIZATION IN AMERICAN
INDIANS

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Following Surgical Coronary Revascularization in American Indians

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ABSTRACT

The burden of cardiovascular disease is rising in American Indians. Compared to other racial and ethnic groups, American Indians have greater risk factors, prevalence, and mortality rates for cardiovascular disease compared to other races (Eschiti, 2005), including diabetes mellitus, obesity, hypertension, and tobacco use (Kurian & Cardarelli, 2007). With respect to American Indians undergoing surgical revascularization with coronary artery bypass grafting, mortality rates are reported to be higher than the general population and other ethnic groups (Nallamotheu et al., 2001). The present project evaluates current algorithm driven protocols in relation to discharge medications and adherence to follow-up care in this at-risk population.

While the need for patient education is vital to the overall reduction of mortality related to coronary artery disease in all populations, we must first ensure health care providers are providing care using evidenced-based practice guideline. With the American College of Cardiology Foundation and American Heart Association evidenced-based guideline, there should be an improvement in medical therapy and follow-up care, which will ultimately affect the median and long-term patient outcomes.

A retrospective chart review of patients undergoing surgical coronary revascularization at Sanford Health Fargo, North Dakota from 2008 to 2013 was performed. Of the 204 patients identified, 100 were American Indian. A 1:1 comparison with individuals of non-American Indian decent was completed. Medications on discharge and follow-up medical appointments were evaluated and mortality within one year was assessed.

The Americans Indians patients were younger (61.3 vs 64.1 years; $p<0.0306$); had significantly higher rates of diabetes mellitus and insulin-dependent diabetes mellitus, and were significantly more likely to be active tobacco smokers. American Indians were less likely to be

discharged on a beta-blocker (90.0% vs 97.12%; $p<0.0375$). Postoperative medical follow-up in the American Indian patients had statistically significant deficiencies when compared to non-American Indians follow-up care with a primary care provider. Overall, the results of this project suggest a greater need for health care providers to adhere to American College of Cardiology Foundation and American Heart Association guideline directed medical therapy following coronary artery bypass graft surgery and improvements in outpatient medical care including follow-up.

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CHAPTER ONE. INTRODUCTION

The burden of cardiovascular disease (CVD) continues to rise in American Indians (AIs) (Welty et al., 2002). According to the Centers for Disease Control and Prevention (CDC, 2011), among racial/ethnic populations, coronary artery disease (CAD) prevalence was greatest among AI at 11.6%. Additionally, AIs have greater risk factors, and mortality rates for cardiovascular disease (CVD) compared to other races (Eschiti, 2005; Veazie et al., 2014). Risk factors include comorbidities such as, diabetes mellitus, obesity, hypertension, and smoking (Kurian & Cardarelli, 2007; Roger et al., 2012). These increased risk factors, not surprisingly, result in twice the numbers of cardiovascular events as compared to the non- AI population, in turn leading to higher mortality rates in this population.

With respect to AIs undergoing surgical revascularization with coronary artery bypass grafting (CABG), mortality rates are reported to be four-fold greater than the general population and other ethnic groups (Nallamothu et al., 2001). This disparity may be linked to several factors, including geographical location, a shortage of health care resources, low volume surgical centers, and reduced access to care (Becker & Rahimi, 2006; Bridges, Edwards, Peterson, & Coombs, 2000; Espey et al., 2014; Nallamothu et al., 2001). Health care disparities in AIs undergoing surgical coronary revascularization are undoubtedly problematic. The goal of this project is to improve intermediate and long term patient outcomes for AIs following coronary artery bypass graft (CABG) surgery through the adherence to American College of Cardiology Foundation/American Heart Association (ACCF/AHA) evidenced-based guideline for directed medical therapy, follow-up care after surgery and the development of a CABG Patient Discharge Algorithm.

Background and Significance

Increased risk factors result in twice the numbers of cardiovascular events for AI as compared to the non- AI population, in turn leading to higher mortality rates in this population (Howard et al., 1999). With respect to AIs undergoing surgical revascularization with CABG, mortality rates are reported to be higher than the general population and other ethnic groups (Nallamothu et al., 2001). American Indians have historically experienced a low burden of cardiovascular disease. However, the incidents of CHD in AIs are currently twice as high as Caucasians, and cardiovascular disease is now the leading cause of death for AIs (Espey et al., 2014; Galloway, 2005; Sequist, Zaslavsky, Galloway, & Ayanian, 2006). American Indians are 36% more likely than Caucasians, to die prematurely due to heart disease (Savitz, 2012), and they have the highest prevalence of combined risk factors for CVD (tobacco use, diabetes, hypertension, hyperlipidemia) with >80% having one or more, and over one-third with three or more (Galloway, 2005). Further, AIs have higher incidents of modifiable risk factors including diabetes mellitus, obesity, hypertension, physical inactivity, and smoking that contribute to the overall morbidity and mortality related to cardiovascular disease.

Type 2 diabetes is a serious global public health problem, which affects disadvantaged populations disproportionately, especially AIs. Compared with the US general population, AIs are 2.3 times more likely to be diagnosed with diabetes and the prevalence of associated comorbidities is 50% higher (Gittelsohn & Rowan, 2011). In 2009, the age-adjusted prevalence of diabetes for adults eligible for Indian Health Service (IHS) was 16.1%, which is more than twice that of non-Hispanic white adults (Jiang et al., 2013). Diabetes mellitus is the strongest emerging risk factor for AIs in the rising incidents of CHD (Sequist et al., 2006). Most patients with type 2 diabetes are obese, and the global epidemic of obesity largely explains the dramatic

increase in the incidence and prevalence of type 2 diabetes over the past 20 years (Eckel et al., 2011).

Obesity has been associated with type 2 diabetes as well as other chronic diseases, including heart disease, stroke, and certain types of cancers (Slattery et al., 2010). The incidence of obesity has been increasing at disturbing rates worldwide. According to Davies and Mullan (2014), worldwide obesity rates have doubled since 1980, and currently more than 35% of adults are obese. This epidemic is associated with higher mortality risks, higher health care costs, impaired physical functioning, lower quality of life, and higher morbidity from major cardiovascular and non-cardiovascular causes (Hankinson et al., 2013). Those that are overweight and obese are associated with excess cardiovascular and non-cardiovascular deaths in the general population; central obesity is directly associated with higher mortality in individuals with CAD (Coutinho et al., 2011). In a study conducted by Jernigan, Duran, Ahn, and Winkleby (2010), AI reported higher obesity rates (23.9% versus 18.7%) and decreased leisure time physical activity (32.5% versus 27.5%). In another study, thirty-six percent of AI men and 41% of AI women are considered obese as compared to 27% Caucasian males and 30% Caucasian females (Eschiti, 2005). Obesity has contributed greatly to the epidemic of diabetes that is currently afflicting this population; more than 75% of middle-aged and older AI men and women are overweight, with the majority exhibiting central obesity (Gray et al., 2000). According to Hall et al. (2010), obesity is associated with a cascade of metabolic and cardiovascular disorders, including hypertension, a primary mediator of obesity-induced cardiovascular disease.

Hypertension is a significant risk factor in CVD, affecting an estimated 76.4 million US adults (Graham, Yancy, Boehm, & Wendt, 2012). As reported in the Racial and Ethical

Approaches to Community Health survey data, Galloway (2005) reported AI men had the highest prevalence of hypertension and high blood cholesterol. As reported by Hassan Talukder et al. (2011) smoking is a major independent risk factor for cardiovascular disease (CVD), including hypertension.

Smokers have a 70% higher risk for CVD compared to non-smokers (Kurian & Cardarelli, 2007); cigarette smoking among AI ranged from 21.2% in the Southwest to 44.1% in the Northern Plains. American Indian's have the highest smoking prevalence of any ethnic group, 40.4%, compared with 27.4% among non-Hispanic Whites (Jernigan et al., 2010). Individuals who continue to smoke after experiencing a myocardial infarction have a 50 % higher risk of recurrent coronary events compared to nonsmokers. With those who stop smoking after a myocardial infarction, the risk of coronary events declines over time so that their risk is equal to that of nonsmokers by three years after smoking cessation (Mohiuddin et al., 2007).

Overall, AIs have a greater prevalence of known risk factors for CAD. When compared to other racial and ethnic groups, AIs have the highest prevalence of CVD at 16.4 %; the prevalence of diabetes increased by 26.9%, obesity increased by 25.3%, hypertension increased by 5%. American Indians have the highest smoking prevalence of any racial group 40.4% compared with 27.4% among Caucasians (Jernigan et al., 2010).

Aggregate data collected from IHS from 1989 to 1991 and 1996 to 1998 shows that the CVD mortality rates among AIs increased by 16% whereas this rate declined in all other racial minorities and in the Caucasian population (Jernigan et al., 2010). In a recent study by Dyke et al. (2013), AIs present to the hospital with higher levels of acuity as well as higher prevalence of comorbid conditions than non-AI. With the increase in comorbidities, they frequently required

resuscitation prior to surgery and were more likely to need urgent or emergent revascularization, placing them in a high-risk category for surgery.

Problem Statement

American Indians have a two-fold higher incidence rate of cardiovascular disease than other racial and ethnic groups in the United States (Howard et al., 1999; Nallamotheu et al., 2001). When they present to the hospital, they are usually more acutely ill, requiring resuscitation at higher rates than non-AI. In 2013, Dyke et al. reported that AIs had longer hospital stays compared to non-AIs, and continued to state that they had lower survival estimates in the medium-term (4.5%) compared to non-AI population beginning approximately one year following surgery. According to Hadjinikolaou, Klimatsidas, Iacona, Spyt, and Samani, (2010), medium-term survival following CABG surgery is defined as 30 days up to five years. Understanding this disparity and identifying potential causes is needed to reduce health care disparities in AI following surgical coronary revascularization. Under prescribing of recommended ACCF/AHA guideline-directed medical therapy after CABG in AIs as well as non-AI patients is potentially a causative factor increasing mortality. The prevention of cardiovascular morbidity and mortality is a shared responsibility among all health professionals involved in the care of people at risk for cardiovascular disease (Merz et al., 2009).

Project Design and Objectives

The purpose of this project was to improve medical care by evaluating the utilization of current evidenced-based practice (EBP) in prescribing ACCF/AHA guideline-directed medical therapies, and improving access to appropriate medical follow-up. The purpose of this project was met through the following objectives: 1) Identified inconsistencies between current provider practices and ACCF/AHA evidenced-based practice treatment guideline for AIs post CABG, 2)

Examined provider treatment plans between AI and non-AIs post CABG, 3) Determined patient adherence to the prescribed discharge treatment plan. 4) Develop recommendations for treatment plans post-CABG surgery in AI patients and recommendations for follow-up visits and post-CABG care.

This project was designed as a retrospective chart review to examine the medical records of 100 AI patients and 100 medical records of non-AI patients. The development of a chart audit tool was completed and used to document necessary information to meet the project objectives. The current ACCF/AHA evidenced-based guideline for the management of patients' post-CABG was used as a basis for guideline-directed medical therapy (Hillis et al. 2011). Additionally, the ACCF/AHA guideline provide guidance regarding the coordination of follow-up medical care with cardiovascular surgery, cardiology, and the individual's primary care provider for the management of comorbid conditions, especially diabetes mellitus and hypertension, along with smoking cessation if applicable.

CHAPTER TWO. REVIEW OF LITURATURE

There are an estimated 4.9 million persons, in 565 federally recognized tribes, who are classified as American Indian (AI) or Alaskan Native, making up approximately 1.6% of the U.S. population (Horowitz, 2012). American Indians represent a diverse group of individuals living across the United States, and various tribes have different histories, languages, cultural beliefs, and traditional practices. Many tribal nations suffer from a disproportionate burden of health problems including cardiovascular disease, diabetes, hypertension, fair/poor perceived health status, and current tobacco use. Moreover, low socioeconomic status is an important risk factor for virtually all chronic diseases and conditions, especially those related to cardiovascular disease (CVD) (Levin, Lamar Welch, Bell, & Casper, 2002). Additionally, the complications related to CVD are chronic, slowly progressive, and cumulative, eventually leading to occlusion, ischemia, and the need for a coronary artery bypass graft (CABG) surgery (Finn, Nakano, Narula, Kolodgie, & Virmani, 2010).

Coronary artery bypass graft surgery, one treatment modality for CVD, can help to restore blood flow to an area of the heart. “Coronary artery bypass surgery is the most durable and complete treatment of ischemic heart disease” (Kulik et al., 2015, p. 1). However, surgery does not stop the progression of CVD. A number of factors increase the risk of developing or speeding the progression of heart disease including smoking, diabetes, hypertension, and obesity. Comprehensive risk factor management reduces these risks associated with CVD (Kulik et al., 2015).

The American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) has jointly produced guideline in the area of cardiovascular disease. The authors stated, “clinical practice guideline can provide a foundation for other applications, such

as performance measures, appropriate use criteria, and both quality improvement and a clinical support tool” (Hillis et al., p. e654). This practice guideline are intended to assist healthcare providers in clinical decision making by describing a range of generally acceptable approaches to diagnosis, management, and prevention of specific disease conditions, with a goal to improve quality of care (Hillis et al., 2011). One widely used approach is the use of guideline directed medication therapy.

Medication adherence is associated with improved outcomes among patients with CVD (Ho, Magid, Masoudi, McClure, & Rumsfeld, 2006). Furthermore, Ho et al. (2006) reported that patients receiving any cardioprotective medication had lower mortality compared to those that had not received the medications. Using medication therapy after coronary incidents to reduce mortality has proven effective in the reduction of morbidity and mortality. According to Bouchard et al. (2010), measures of preventative treatment, including the use of beta-blockers and statin medications, have significant benefits after CABG surgery. The benefit to postoperative use of beta-blockers following CABG reduces the incidence or clinical sequel of atrial fibrillation and both beta-blockers and statin therapy have shown an overall reduction in perioperative death (Bouchard et al., 2010; Hillis et al., 2011). Despite evidence supporting the use of beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and lipid lowering agents in eligible patients after CABG surgery, adoption of these secondary prevention measures has been inconsistent (Williams et al., 2011). These inconsistencies may be multifactor; including bias in the pattern of care, active versus passive participation in stages of care, and physicians' awareness of and compliance with the guideline. American College of Cardiology Foundation and the American Heart Association (ACCF/AHA) guideline are based on evidenced-based practice and demonstrate conclusively that beta-blockers, ACE inhibitors, statins, and aspirin

therapy decrease morbidity and mortality in CABG and acute myocardial infarction patients (O’Gara et al., 2011).

Hillis et al. (2011) discussed the efficacy and the use of therapeutics post-CABG as well as smoking cessation and cardiac rehabilitation in the overall reduction in the risk of death post-CABG. The authors stated that “lipid lowering therapy in CABG patients have demonstrated that lowering LDL cholesterol with statins influence post-CABG outcomes” (Hillis et al. 2011, p. e678). Furthermore, they stated that improved survival was noted in all patient subgroups receiving beta-blockers. In regards to ACE inhibitors, they reported that the drugs are known to exert cardiovascular protective actions, particularly in patients with left ventricular systolic dysfunction, hypertension, diabetes mellitus, or chronic renal insufficiency (Hillis et al. 2011).

The ACCF/AHA practice guideline (Hillis et al., 2011) were intended to assist healthcare providers in clinical decision making by describing a range of generally acceptable approaches to prevent, diagnosis, and manage specific diseases and conditions. As stated in the ACCF/AHA practice guideline, the Class of Recommendation (COR) is used to estimate the treatment effect considering risks versus benefits. In addition, Hillis et al. provide evidence that a given treatment is or is not useful/effective in a certain situation and may even cause harm.

History and Culture

American Indians represent a diverse group of individuals living in all geographic regions of the United States; various tribes have different histories, languages, cultural beliefs, and traditional practices. In North Dakota, the American Indian population is 6.4% of the total population, and approximately 55% of the population lives on one of the five Tribal Nations (North Dakota Indian Affairs Commission, 2010). According to the United States Census Bureau (2012), AIs represent approximately 1.2% of the total population of Minnesota. This

project focused on two AI Tribal Nations; the Sisseton-Wahpeton Oyate Nation, located in Southern North Dakota/Northern South Dakota and the Red Lake Nation located in Northern Minnesota. While each Tribal Nation is unique, many AI communities have similar characteristics: close family relationships, identifiable communities, small community size, strong community support, and deep spiritual beliefs ("Cultural Competency: Serving American Indian Patients," 2010).

According to AI history, each tribe had one or more elders who were groomed in the healing arts. These individuals served as herbalists, healers, and spiritual communicators. Healing practitioners have passed many of the healing practiced and spiritual ceremonies on to the next generation of healers. The understanding of traditional Indian medicine by many scientists, lay persons, and New Age healers, are not based on purely traditional teachings but are a mix of AI ceremonies, new age spirituality, and western medicine. As a result, the understanding of tradition medicine remains meager, fragmented, and often distorted (Rhoades, 2000). Although the recognized AI Tribal Nations in North America do not comprise a monolithic group, their communities share many elements in their healing traditions (Horowitz, 2012). A generally accepted AI concept of health is that it is a tangible reality, not simply the state of being free of disease. This health, or wellness, is often described as the ability to exist in a harmonious relationship with all other living things, but also with a number spirits, including a great and all-powerful spirit (Rhoades, 2000). American Indians hold a holistic perspective on health based on a balance of the interrelationship of body, mind, spirit, and the environment (Horowitz, 2012). Many of the healing practices link to spirituality and do not separate the mind, body, and spirit. Healing practices are not recorded and may never be, as they are

considered sacred, private knowledge, and revealed only to certain members of the tribe through visions or initiations (Carlock, 2006).

Although different Nations have distinct cultural values, traditions, and customs, there are a number of beliefs commonly shared among many AI people. Illness or disease is believed to occur due to spiritual problems (Carlock, 2006). American Indian communities include extended families and holistic problem solving. Indian culture holds traditional healing rituals that focus on restoring the balance of physical, emotional, mental, and spiritual well-being. All aspects of life are important and need to be balanced. Health is achieved by maintaining balance and harmony within oneself and between oneself and the external world (Carlock, 2006). If important aspects of life are ignored, life will be unbalanced and more difficult. Symbolic healing rituals may involve entire communities and include singing, dancing, and drumming ceremonies (Ryback & Decker-Fitts, 2009).

Cultural beliefs are deeply rooted in the lives of many AIs and these beliefs significantly influence their health seeking behaviors. Historical mistrust of outside organizations is a frequent barrier among many American Indian communities due to previous experiences and stereotypes (Horowitz, 2012). Healthcare providers need to incorporate traditional healing practices and be aware of cultural beliefs regarding healthcare and healing practices in order to reduce the disparities. Collaboration with traditional AI healers can improve health outcomes for AI patients (Rybak & Decker-Fitts, 2009). Additionally, healthcare provider awareness of historical influences and specific cultural beliefs of various tribes will help to provide culturally sensitive care and establish a trusting relationship between the provider and the patient.

Sisseton-Wahpeton Oyate Nation

The Sisseton-Wahpeton people consist of two joined bands of the eastern Dakota Nation (Garcia et al., 1997). These two originally inhabited lands in Canada and Minnesota, as well as North and South Dakota (Gagnon, 2011). The Lake Traverse Reservation located in South Dakota and southern North Dakota was established with the signing of the Lake Traverse Treaty of 1867.

Many cultural beliefs and practices are shared between tribal nations; Sioux basic beliefs are derived from the revelations of supernatural Beings to the people through direct teaching and dreams (Gagnon, 2011). The Sisseton-Wahpeton people believe that White Buffalo Calf Woman came to the Dakota-Lakota-Nakota Nation to provide the sacred pipe and the seven sacred ceremonies (sweat lodge, vision seeking, sun dance, hunka, buffalo sing, spirit-keeping ceremony, and throwing the ball). Some of these sacred ceremonies are regularly performed today, including the sweat lodge and Sun Dance (Gagnon, 2011). Traditional healers and medicine men continue to influence the AI people through their wisdom and knowledge of religious ceremonies.

Red Lake Nation

Ojibwes, or Chippewa, are a people of the Great Lakes region in both the United States and Canada. Red Lake Nation is a federally recognized Indian reservation and is one of the few completely sovereign reservations in the United States. Red Lake Nation established its independence on July 6, 1889 following the culmination of negotiations that established the sovereignty of the Red Lake Band of Chippewa Indians (<http://www.redlakenation.org>).

Ojibwes believe in the Creator, who is neither male nor female. The Creator shares power with others (the trees, plants, animals, water, other spirits and people) that are often

messengers for the Creator, bringing the Midewiwin (a religious society of healers dreams and spirit guides (Dwyer & Adare, 2013). Depending on local traditions, there are four or eight levels of Midewiwin; its members are called Mide. Native healers have traditionally been given the same respect as modern day doctors because they can use herbs to treat the sick. The Midewiwin believe that living a patient, moderate, truthful, and respectful life, combined with using medicine plants given by the Creator, prolongs life (Dwyer & Adare, 2013). The changing nature of disease has led to alterations in traditional ceremonies and medical practices (Hill, 2003).

A Culture of Poverty

American anthropologist, Oscar Lewis in 1961, introduced the concept of a culture of poverty. The culture of poverty theory is explained as those who find themselves in the grips of the poverty class, for whatever historical reasons, acquire a set of beliefs and values congruent with that status and the limitations it imposes (Graves, 2003). According to Gorski (2008), the premise of the culture of poverty paradigm remains the same: that people in poverty share a consistent and observable culture that perpetuates poverty from one generation to the next; the individuals feel marginalized, helpless, inferior, and adopt an attitude of living for the present.

These socioeconomic factors are likely contributing to healthcare disparities in the AI population. Nearly one quarter of AI families are living below the federal poverty line, a rate that is 143% higher than whites (Hutchinson & Shin, 2014). According to Hawkins, Jhund, McMurray, and Capewell (2012) numerous challenges face people of poverty including affordability of drug regimens, transportation costs, limited access to healthcare, inequalities in treatment, and fewer contacts with medical providers. Socioeconomic status is a powerful predictor of incident coronary disease and adverse cardiovascular outcomes (Hawkins et al.,

2012). As a result, socioeconomic status (SES) directly affects the health of individuals, and living in poverty reduces one's access to healthcare.

Indian Health Services

The Indian Health Service (IHS), an agency within the Department of Health and Human Services, is responsible for providing federal health services to American Indians and Alaska Natives. According to IHS, the organization is the principal federal health care provider and health advocate for Indian people with the goal to raise their health status to the highest possible level (<http://www.ihs.gov>). Indian Health Service provides a comprehensive health service delivery system for approximately 1.9 million American Indians and Alaska Natives who belong to 566 federally recognized tribes in 35 states. The current IHS consists of three branches: 1) a federally operated direct care system, 2) an independent tribally operated health care facilities, and 3) a small urban health care program (Sequist et al., 2010). Services offered by IHS include comprehensive primary care, specialty services, and prescription drug coverage. However, inadequate funding of IHS has adversely impacted AI people by reducing access to health promotion and disease prevention interventions (Warne, Kaur, & Perdue, 2012).

Furthermore, according to Holm et al. (2010), the IHS operates with only 59% of the necessary resources to provide high-quality care. Interestingly, per capita healthcare spending by the federal government is twice as high for prisoners compared to healthcare spending for American Indians. Payments for services are paid to providers on behalf of IHS for individuals in need of private sector screenings, procedures, or diagnostic testing if funding is available; unfortunately, contract health services funding is not typically sustained for the whole fiscal year (Warne et al., 2012). Lack of adequate funding for contract health services may lead to

restrictions in access to specialty services, such as cardiac rehabilitation, and access to cardiologists, creating a greater burden of health disparities among AIs.

Indian Health Services Director ADM Charles Grim approved the IHS National Pharmacy and Therapeutics Committee (NPTC) in February 2004. The original charge was to look at the development of a national formulary due to the substantial increases in the cost of pharmaceuticals nationally, to improve quality of care, and to look at the use of formulary decisions as a cost management tool (<http://www.ihs.gov/nptc/index.cfm>). A review of the current IHS formulary (<http://www.ihs.gov/nptc/documents/formulary/NationalCoreFormulary.pdf>) includes the current ACCF/AHA recommended guideline-directed medical therapy (Hills et al., 2011) such as beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and high intensity statin therapy.

Sanford Health

Sanford Health is an integrated health system headquartered in the Dakotas and is now the largest rural, not-for-profit health care system in the nation with locations in 126 communities in nine states. Sanford's mission is "dedicated to the work of health and healing, with a vision of improving the human condition through exceptional care, innovation, and discovery" (<http://www.sanfordhealth.org>). In addition to strong clinical care, Sanford is also committed to engaging in medical research to discover innovative ways to provide care and cure for common diseases.

Theoretical Framework

Many social, cultural, and economic factors contribute to the development, maintenance, and change of health behavior patterns (Glanz & Bishop, 2010). Social ecological models (SEM) recognize individuals as embedded within a larger social system and describe the

interaction characteristics of individuals and environments that underlie health outcomes (Golden & Earp, 2012). The SEM describes the healthfulness of a situation and the well-being of its individuals are assumed to be influenced by both the physical and social environments as well as personal attributes of the individual (Pender, Murdaugh, & Parsons, 2014). The SEM is intended to promote well-being; however, the interdependence among all components and levels of the environment must be taken into account. This project looks at the individual patient and his or her treatment plan. If applicable, the situation would require an organizational change to ensure ACCF/AHA guideline-directed medical therapies are being followed to optimize management of this patient population. Following discharge, the patient returns to their home community, and if they are AI, the individual may seek follow-up care at the local IHS. The social ecological approach integrates person-focused efforts to modify a person's health behavior with environmental-focused interventions to enhance their physical surroundings (Stokols, 1996). Improving the health of AIs in the post-CABG phase of care may require interventions that target multiple levels of influence, in various settings; this would fit the basis of the model. Minkler (1999) states that individuals developmental histories and their social support system, along with organizational structures and processes can positively or negatively affect their health behavior. This includes community-mediating structures such as schools, neighborhoods, and churches, community networks and power structures. The content of our public policies are the key components of a broad socio-ecological perspective and essential determinants of health and health behavior. The SEM functions beyond focusing solely on environmental factors to include transactions of the individual and groups with the environment. Although this is a major strength, identifying the critical determinants that can be realistically targeted for change can be challenging (Pender et al., 2014).

The goal of this project was to provide an opportunity for individuals to make positive health changes and to develop a strong support system willing to assist them in the necessary changes. Secondly, the organization (Sanford Health) will make necessary process changes to ensure ACCF/AHA guideline-directed medical therapies are followed and the treatment plans are communicated to individual's primary care provider. Indian Health Services in turn should continue the treatment plan as prescribed encouraging patients to make the necessary lifestyle changes to decrease the risk of early mortality related to cardiovascular disease.

Conclusion

In summary, AIs experience significant health disparities compared to the general United States population. Furthermore, AIs have higher incidents of modifiable risk factors including diabetes mellitus, obesity, hypertension, physical inactivity, and smoking that contribute to the overall morbidity and mortality related to cardiovascular disease. The adherence to ACCF/AHA evidenced-based guideline in CAD will assist providers in delivering care that has the potential to improve overall health, enhance quality of life, and reduce disparities in not only the AI population but also all racial and ethnic groups.

CHAPTER THREE. PROJECT DESCRIPTION

Project Implementation

The practice improvement project was an evidence-based intervention plan based on results of an extensive literature review. Data from numerous research studies indicated the need to develop interventions to reduce risk factors, prevalence, and mortality rates for cardiovascular disease in the AI population (Cho et al., 2014; Eschiti, 2005; Espey et al., 2014; Galloway, 2005; Kurian & Cardarelli, 2007; Veazie et al., 2014). Understanding these disparity and identifying potential causes is needed to reduce health care disparities in AI patients following surgical coronary revascularization.

Although AIs are 36% more likely than Caucasians, to die prematurely due to heart disease (Savitz, 2012), secondary prevention measures are effective in reducing morbidity and mortality. Secondary prevention focuses on early detection and treatment of disease, with the purpose to cure disease, slow its progression, or reduce its impact on individuals or communities (Smith et al. 2011). According to McLeod, Brooks, Taylor, Currie, and Dewhurst (2004), secondary prevention measures for coronary heart disease are effective in reducing coronary morbidity and mortality. Measures commonly recommended by evidence-based guideline to improve cardiac risk factors include prophylactic drug therapy (anti-platelet agents, beta-blockers, statin therapy, and ACE inhibitors), lifestyle changes, and risk factor control (smoking cessation, dietary modification, and weight reduction). The ACCF/AHA guideline for coronary artery bypass graft surgery was used as the evidenced-based guide in the development of this project. This guideline demonstrates conclusively that recommendations, if followed, decrease morbidity and mortality following CABG (O’Gara et al., 2011).

Not only is there a need to increase secondary prevention in the outpatient setting, health care providers need to remain educated on existing and changing EBP guideline. The prevention of cardiovascular morbidity and mortality is a shared responsibility among all health professionals involved in the care of people at risk for cardiovascular disease (Merz et al., 2009).

Project Description

Healthcare providers are responsible for 1) providing education regarding disease and the processes associated with the disease, 2) continuing chronic medication therapies to aid in the reduction of morbidity and mortality related to cardiovascular disease, and 3) to ensuring adequate follow-up care are available and attainable to the individual patient. The purpose of this project was to improve medical care by using current EBP in prescribing ACCF/AHA guideline-directed medical therapies, and to improve access to appropriate medical follow-up. In turn, this project identified potential causes related to short and medium term mortality rates in AI patients following surgical coronary revascularization. The health care disparity that exists in the AI population may be multi-factorial including co-morbid conditions, less intensive medical follow-up, and access to medications known to reduce cardiovascular risk factors. A better understanding of the causative factors leading to increased mortality in AI patients post-CABG surgery provide directions for further efforts by providers to improve outcomes not only in post-CABG patients, but also in all patients with coronary artery disease.

Preliminary data collected from Dyke et al. (2013) identified 1,365 patients who underwent CABG surgery at Sanford Health Fargo between the years of 2008-2012, of which 83 were identified as AI (6.1%). This is similar to the 2010 Census Bureau data for the population of AIs in North Dakota. American Indian patients appeared to be younger, sicker, and having a greater number of cardiovascular risk factors than non-AIs on presentation to the hospital; thus,

they required urgent or emergent surgery and were less likely to be afforded the opportunity to undergo surgery on an elective basis.

The purpose of this project was to improve medical care by evaluating the utilization of ACCF/AHA guideline-directed medical therapies, and improving access to appropriate medical follow-up. The purpose of this project was met through the following objectives: 1) Identified inconsistencies between current provider practices and ACCF/AHA evidenced-based practice treatment guideline for AIs post CABG, 2) Examined provider treatment plans between AI and non-AIs post CABG, 3) Determined patient adherence to the prescribed discharge treatment plan. 4) Develop recommendations for treatment plans post-CABG surgery in AI patients and recommendations for follow-up visits and post-CABG care.

This project was a retrospective chart review to examine the medical records of 100 AI patients and 100 medical records of non-AI patients. Thorough evaluations of allergies, discharge medications, and follow-up care as well as notes were reviewed. This data were quantified to identify potential deficiencies in practice in hopes of developing strategies for improving care. Current ACCF/AHA evidenced-based guideline (Hillis et al., 2011) for management of patients following CABG surgery was used as a basis for guideline-directed medical therapy on reducing the morbidity and mortality of patients post-CABG. The coordination of follow-up medical care with cardiology, cardiovascular surgery, and the individual's primary care provider to management of comorbid conditions, especially diabetes mellitus and hypertension, along with smoking cessation if applicable can be a daunting task for individuals following a major health crisis.

Project Development

A meeting was scheduled with Dr. Dyke at Sanford Health Fargo, regarding the project and its possible impact on patient outcomes. Then a literature review was performed to learn about the AI culture and evidenced-based articles relating to CABG. This review formed the groundwork for the proposed project.

Data were collected through a retrospective Electronic Chart Audit (ECA). The ECA measurement tool was developed based on the 2011 ACCF/AHA Guideline for CABG. Additionally, this ECA tool was reviewed by experts in the field of survey development, public health, medicine, and cardiovascular disease for validity. Minimal changes were made to the draft of the audit tool after consultation (Appendix B). The audit tool included patient demographics (age, gender, body mass index, and current smoker), disease processes, and comorbidities, cardiac presentation at the time of admission, medications at discharge, and follow-up appointments. The author is employed at Sanford Health; therefore, he was comfortable with the electronic medical records and the medical terminology used in the patient charts. He verified that the data on the ECA tool was documented in EMR. Interpreter reliability was not assessed because it was only the author collecting data.

After approval from North Dakota State University Institutional Review Board along with Sanford Health Institutional Review board, the electronic medical records of the previously identified 100 AI were studied along with 100 non-AI medical records of similar demographics. The charts were dissected and clinical data that was collected was retrospective. Data collection included patient demographics, age, gender, allergies, date of admit, date of surgery, and date of discharge. Discharge order sets were reviewed and a list of discharge medications was compiled for each patient. The dates of follow-up appointments with primary care providers, cardiology,

and cardiovascular surgery were noted. Provider notes post-discharge were examined and medication changes were noted. When statistical analysis was completed, ACCF/AHA guideline for post-CABG (Hillis et al., 2011) were examined and compared with current Sanford Hospital discharge algorithms.

Institutional Review Board Approval

The human subjects for this project were patients that had previously undergone CABG surgery at Sanford Health Fargo, North Dakota between the years of 2008-2013, which included women and minorities. However, no children were included in the project. This practice improvement project did not involve direct patient contact; thus, there was little to no risk to the patients throughout the entirety of the project. Potential risks in this project were minimal as it was a retrospective design reviewing medical records. The North Dakota State University Institutional Review Board, as well as Sanford Health, Fargo, North Dakota granted protection of human subjects.

Potential benefits of this evidence-based project include a better understanding among healthcare providers of AI culture, barriers to healthcare, and prescribing practices of medication therapy after CABG surgery. Additionally, providers will be strategic with establishing frequent medical follow-up care, both within the organization and in satellite clinics, to reduce mortality in AI following CABG surgery. Heightened awareness of prescribing practice and follow-up medical visits will assist healthcare providers in creating more effective and culturally sensitive treatment options. This project has a high potential to benefit both healthcare providers and the AI population following surgical coronary revascularization.

Data Collection

Data collection related to this project had several obstacles. First, Sanford Health Fargo adopted an EMR in 2011. Patient related data is currently located in the EMR One chart as well as in the previous system Centricity. Access to Centricity is currently restricted to medical doctors, nurse practitioners, and physician's assistants. Students are not given access to Centricity without prior authorization. Access for the author was requested on two occasions and was granted after a written request from Dr. Dyke. The second limitation was related to the information technology department at Sanford Health Fargo. Multiple requests were sent to Sanford's IT department for the development of an electronic query to gather data regarding AI and non-AI post-CABG patients between the years of 2008-2013. According to Sanford's Information Technology Department, they were unable to complete the request for the development of a query due to time constraints and lack of resources. However, requests for queries were not consistent; queries have been granted on other recent projects. As a result, data collection was conducted by the author by manually searching for post-CABG patients that met the selected criteria.

A request for remote access (the ability to access medical records via the internet for a location other than Sanford Health) to both of Sanford Health's EMRs (Epic's One Chart & Centricity) was also denied on multiple occasions. Remote access is granted for medical providers however, it excludes residents and students, further limiting convenient access to data collection. The ability to access the medical records relating to this project proved to be more difficult than initially anticipated. Computer availability and a secure location in which to access patients medical records at Sanford Health was also limited, as office space or research friendly space is at a premium.

Patients for this study were identified from the previous study conducted by Dyke et al. (2013) at Sanford Health Fargo. The AI patient population was determined by the patients that had CABG surgery at Sanford Health Fargo from the years 2008-2013 and who self-identified themselves as American Indian on the initial hospital admission form. The patient's that identified themselves as AI were separated from the non-AIs and the patient's medical record number (MRN) was input into the EMR and data was sought and recorded on the Electronic Chart Audit tool for each individual patient. Once data collection of the AI group was done, a 1:1 match of the AI group with the non-AI group using the basic demographic information of patient age and sex was completed. The MRN numbers of the non-AI patients was used in the same fashion and data recorded on the Electronic Chart Audit tool.

CHAPTER FOUR. EVALUATION

The social ecological model (SEM) views the individual in the context of their families, communities, and cultures, emphasizing the relationships among environmental, biological, and behavioral determinants of health. The SEM also focuses on interactions between a person's physical, social, and cultural surroundings, and therefore, it is believed to provide the best approach in efforts to prevent increasing mortality rates in all ethnic groups (Caprio et al. 2008).

The SEM defines the theoretical framework used to evaluate the objectives of this project. Health behaviors of the individual or patient (inner oval) are influenced by interpersonal, organizations, community, and public policy domains represented by the progressively larger ovals. For the purpose of this project, the organization included Sanford Health, IHS, and various medical clinics within the region. The public policy would be considered current evidenced-based guideline such as the ACCF/AHA guideline for coronary artery bypass graft surgery: A report of the American College of Cardiology Foundation and American Heart Association task force on practice guideline. Many influencers may span more than one domain, however at the center remains as always the individual/patient. The SEM goes beyond a focus solely on environmental factors to include transactions of the individual and groups with the environment. Although this is seen as a major strength, identifying the critical determinants that can be realistically targeted for change can be challenging (Pender et al., 2014). Figure 1 shows an excellent representation of the project; again, the focus remains the individual. In order to target appropriate change, we must look at the possible domains involved and guide interventions to target specific health behaviors as well as organizational change.

The SEM is composed of interconnected elements, and considers how all these levels of influence can be addressed to support long-term, healthful lifestyle choices. For the purpose of

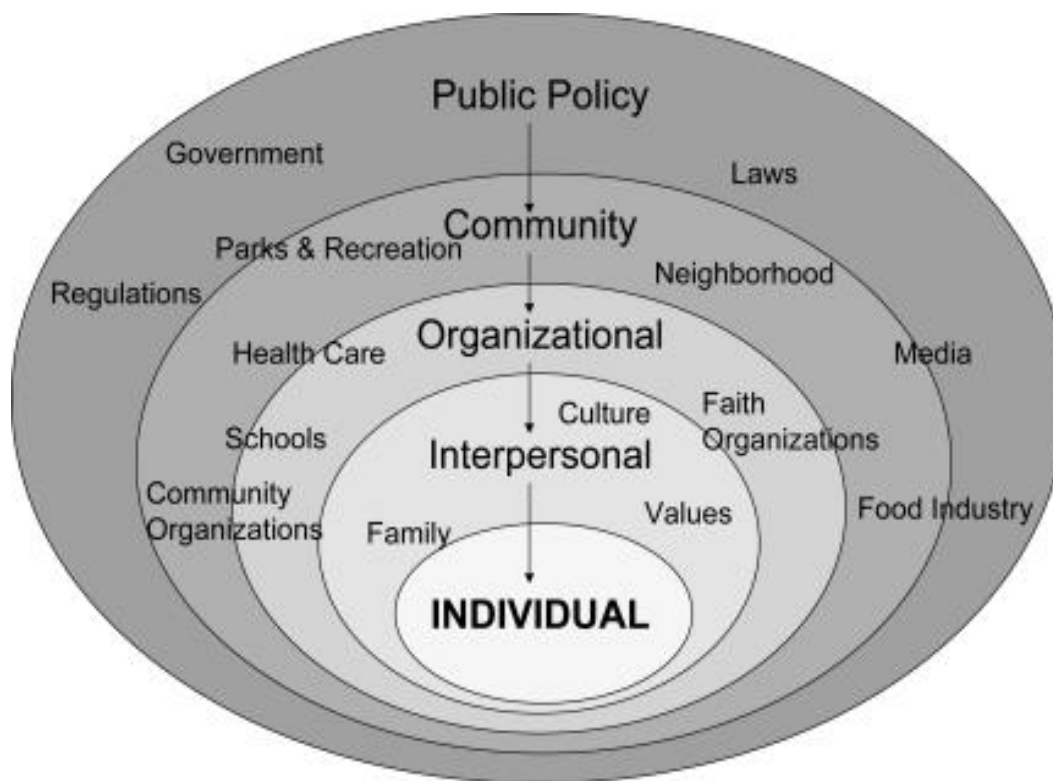
this project, the individual is central, and concentric circles that affect the individual are ever changing. Each of these elements influences the individual and without appropriate change at each level, the individual may feel overwhelmed and resist such change.

The second element of the SEM is the interpersonal element. Within this circle are things such as family, culture, and values. This element is vital to personal change and involves the most dynamic elements in the individual's life. Family must be willing to change aspects of their lives in order to benefit the individual. These factors include diet, exercise, and smoking cessation. Within this element are cultural factors, such as the role of tobacco in traditional beliefs and ceremonies make tobacco cessation a challenging issue (Espey et al. 2014) in the American Indian population following CABG surgery.

The third element is the organization, in this study the organization is both Sanford Health Fargo and IHS. In order to better serve the individual, organizations must incorporate change as well to accommodate the needs of the individual. As previously mentioned, IHS is in need of greater funding and specialty services to greater impact the health needs of the people. The fourth element of the SEM is considered the community. Within the community are the individual's neighborhood, city, and reservation. The impact the community can have on the individual is endless. The ability to embrace change at a community level can be a daunting task with the lack of financial support needed for change. In the community, there should be a community or rehabilitation center that provides opportunities for cardiac rehabilitation and educational programs for smoking cessation, healthy eating classes, and the management of diabetes.

The final element of the SEM is public policy; these include factors of the health, economic, educational, and social policies. Indian Health Services along with the United States

government also play a role in this element of the SEM. Greater resources are needed to support the needs of IHS and the AI people. Policy change as well as budgetary change can have lasting effects on decreasing healthcare disparities of the AI people now and in the future. The use of the SEM for a study as specific as CABG surgery patients is unusual, however the model provides the framework that was well suited for the best outcomes in the AI population. The individual remains central and change must be multifactorial to be effective and long lasting.



U.S. National Library of Medicine

Figure 1. Social Ecological Model

Project Description

This evidenced-based project was a retrospective study of patients who underwent CABG surgery at Sanford Health Fargo, North Dakota. Data were collected and evaluated on 100 AI

patients as well as 104 non-AI patients. The demographics of both populations were considered, and a 1:1 match of patient's age and sex was performed via a retrospective chart audit utilizing Sanford Health's EMR One Chart and Centricity. The retrospective chart audit allowed for collection of pertinent data in determining if inconsistencies existed in the prescribed treatment plans of American Indians versus non-American Indians following CABG. North Dakota State University's statistics department performed statistical analysis. Variables were analyzed via Chi-squared analysis and statistical significance was predetermined at the $p < 0.05$ level.

Evidenced-Based Measures to Evaluate the Plan

The evidenced-based measures used to evaluate the project included Hillis et al.'s (2011) ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guideline (see Appendix A for ACCF/AHA guideline). This guideline for perioperative management of patients post-CABG surgery includes recommendations for antiplatelet therapy, management of hyperlipidemia, perioperative beta-blocker, and the use of ACE inhibitors/ARBs. The patient's allergies and vital signs (systolic and diastolic blood pressure and pulse) at discharge were collected to ensure the prescribed medications at discharge were tolerated, as well as data regarding demographics to determine if comorbidities played a role in overall mortality rates.

Evidenced-Based Measures/Instruments Used for the Objectives

A retrospective chart audit was implemented using a retrospective Chart Audit Tool (see Appendix B for retrospective chart audit tool) for collection of pertinent data. A retrospective study uses existing data that have been recorded for reasons other than research. According to Cassidy, Marsh, Holleran, and Ruhl (2002), the patient's medical record is often used as a

primary source of retrospective data for the purposes of epidemiological analysis and is considered the gold standard in any study to identify demographic factors, clinical data variables, specific aspects related to treatment regimens, and ultimately patient morbidity and mortality. This project used known AI patients who had undergone CABG surgery and then matched to non-AI patients of similar age and sex who also had undergone CABG at Sanford Health Fargo. The purpose of using a 1:1 comparison for data collection was to reduce the confounding variables and to gain valuable knowledge if inconsistencies in prescriber practice existed between the two groups. Another reason for this type of evidenced-based study allowed for a greater understanding of patient adherence to the prescribed plan of care and medical follow-up practices.

Objective One

To identify inconsistencies between current provider practice and ACCF/AHA evidenced-based practice treatment guideline for AIs post-CABG were evaluated using data collected from the retrospective chart audit comparing written discharge medications to the ACCF/AHA guideline previously discussed. See appendix A for 2011 ACCF/AHA guideline for CABG surgery that provide recommended perioperative management in this patient population. The data regarding the prescribing of discharge medications included beta-blockers, ACE inhibitors/ARB's, lipid management, and antiplatelet agents for the AI group were collected and statistical analysis completed using descriptive statistics.

Objective Two

To examine inconsistencies between current provider practice and ACCF/AHA evidenced-based practice treatment guideline between AI and non-AIs post-CABG, was evaluated using data collected from the retrospective chart audit. The data regarding the

prescribing of discharge medications included beta-blockers, ACE inhibitors/ARB, lipid management, and antiplatelet agents for the AI group and also the non-AI group was collected and statistical analysis was completed using the chi-square test. The data from the two groups were then compared for inconsistencies.

Objective Three

To determine patient adherence to the prescribed discharge treatment plan in AI post-CABG at Sanford Health Fargo. The data was collected using a retrospective chart audit and the pertinent information was gathered regarding follow-up appointments as well as medication changes at these appointments. The prescribed treatment plan called for medical follow-up appointments with the cardiothoracic surgeon, cardiology, and the patient's primary care provider. The retrospective chart audit allowed for review of patients that had returned to Sanford Medical Center, Fargo, North Dakota for these specific appointments. Provider notes were reviewed and documentation of medication additions, discontinuation, or changes were reviewed to determine if they were in accordance with the ACCF/AHA guideline indicating the provider met the standard for EBP. Statistical analysis was completed using descriptive statistics.

Objective Four

The objective to develop recommendations for postoperative care and follow-up after CABG surgery was evaluated by using a retrospective chart audit form. The pertinent information was gathered regarding follow-up appointments and discharge medications. According to Rassaf, Steiner, and Kelm, (2013), patients with coronary heart disease should be followed up regularly (every three to six months) by their primary care physicians, independently of any additional visits that may be necessitated by worsening symptoms, comorbidities, or any

other tests that need to be completed. The current recommendations for postoperative follow-up care per the cardiovascular surgeons at Sanford Health Fargo requires the patient to see cardiovascular surgeon two weeks and four weeks following discharge and as needed. In addition, they should see cardiology in four-six weeks, and they should see their primary care provider (PCP) in one-two weeks after discharge. The 2011 ACCF/AHA guideline was used as EBP for current guideline-directed medical therapy to include prescribing beta-blockers, angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARB's), high intensity statin therapy, and antiplatelet (aspirin) therapy at discharge. Statistical analysis was completed using the chi-square test.

CHAPTER FIVE. RESULTS

In this practice improvement project the sample consisted of a total of 204 patients who had undergone CABG surgery at Sanford Health, Fargo, North Dakota between the years of 2008-2013. Of these, 100 patients (49%) were identified as AI (n=61 male). This group was younger (61.3 vs 64.1 years; $p<0.0306$) than the non-AI group. They were significantly more likely to be active tobacco smokers. When analyzed there was no significant difference between the body mass indexes of the two groups. Patient demographics information is presented in Table 1.

Table 1. Demographic Information on American Indian and Non-American Indian CABG Patients

Variable	AI (n=100)	%	Non-AI (n=104)	%	p-value
Age	61.3±9.2		64.1±9.3		0.031
Range					
30-39	1		1		
40-49	14		7		
50-59	23		21		
60-69	43		43		
70 and older	19		32		
Gender					0.717
Female	39	39	38	36.5	
Male	61	61	66	63.5	
Current Smoker	56	56	29	27.9	<0.001
BMI	31.8±6.1		31.3±5.4		0.594

Cardiovascular risk factors such as the presence of diabetes mellitus and insulin-dependent diabetes mellitus were significantly higher in the AI. Preoperative end-stage renal disease requiring dialysis was more common in AI patients (7.0% vs 3.85%; $p=0.3188$) although this did not reach statistical significance. Data regarding comorbid conditions and clinical presentation are presented in Table 2.

Table 2. Comorbid Conditions and Clinical Presentation of AI and Non-AI post-CABG Patients

Variable	AI (n=100)	%	Non-AI (n=104)	%	p-value
Diabetes	60	60	38.46(40)	38.5	0.002
<u>Controlled by:</u>					
Diet	0	0	2	5	0.158
Oral medication	23	38.3	23	57.5	0.060
Insulin	37	61.8	15	37.5	0.018
Hypertension	83	83	92	88.5	0.264
Chronic Lung Disease	24	24	42	40.4	0.016
Mild	13	54.2	27	64.3	0.418
Moderate	6	25	6	14.3	0.278
Severe	5	20.8	9	21.4	0.955
Pre-Op Congestive Heart Failure	14	14	22	21.2	0.180
Peripheral Vascular Disease	20	20	13	12.5	0.146
Cardiovascular Disease	14	14	46	44.2	<0.001
History of Cerebral Vascular Accident	6	6	5	4.8	0.706
Hemodialysis Dependent	7	7	4	3.9	0.319
Creatinine mg/dl	1.1±1.0		1.1±0.8		0.954
Immunosuppressed	8	8	0	0	0.003
Previous CABG	1	1	0	0	0.369
Cardiac Presentation					
No Symptoms	6	6	1	0.9	0.061
Stable Angina	7	7	22	21.2	0.004
Unstable Angina	41	41	51	49	0.249
NSTEMI	33	33	26	25	0.208
STEMI	13	13	4	3.9	0.030

Table 2. Comorbid Conditions and Clinical Presentation of AI and Non-AI post-CABG Patients (continued)

Variable	AI (n=100)	%	Non-AI (n=104)	%	p-value
Surgical Status					0.000
Elective	12	12	29.81(31)	29.8	0.002
Urgent	70	70	43.27(45)	43.3	0.000
Emergent	18	18	26.92(28)	26.9	0.125
History of Myocardial Infarction	47	47	55	52.9	0.401
< 7 days Prior	41	87.2	38	69.1	0.029
8-21 days Prior	1	2.1	4	7.3	0.230
>21 days Prior	5	10.6	13	23.6	0.086
Cardiogenic Shock	2	2	2	1.9	1.000
Arrhythmias	6	6	17	16.4	0.020
Resuscitation	2	2	3	2.9	1.000
Left Main Disease (>50%)	39	39	43	41.4	0.733
Ejection Fraction %	49.5±13.4		50.9±13.5		0.457
ADP Inhibitors	33	33	12	11.5	<0.001

Note. *p* > value 0.05 level for statistical significance

American Indians presented to the hospital for CABG with a higher level of acuity than non-AI. The incidence of ST-elevation myocardial infarction was significantly different between AI and non-AI groups (12.0% vs 3.85%; *p*= 0.0304), and non-ST-elevation myocardial infarction was more common in the AI group (33.0% vs 25.00%; *p*=0.2077). More AIs presented on antiplatelet therapy (33.0% vs 11.54%; *p*=0.0002), they were more likely to require urgent revascularization (70.0% vs 43.27%; *p*=0.0001), and less likely to undergo elective surgery (12.0% vs 29.81%; *p*=0.0018). American Indians were less likely to be discharged on a beta-blocker (90.0% vs 97.12%; *p*=<0.0375). There was no difference in statin therapy, and aspirin utilization upon discharge. Written Discharge Medications post-CABG in AI and Non-AI Patients are detailed in Table 3.

Table 3. Written Discharge Medications post-CABG in AI and Non-AI Patients

	AI (N=100)	Non-AI (N=104)	Chi-Square	p-value
Beta-blocker	90.0%	97.0%	4.326	0.038
ACE inhibitor/ ARB	26.0%	16.0%	2.856	0.091
Statin Therapy	96.0%	90.0%	2.515	0.113
Aspirin	96.0%	96.0%	0.003	0.955

Objective One

Objective one identified inconsistencies between current provider practices and ACCF/AHA evidenced-based practice treatment guideline for AIs post-CABG. Data were collected using a retrospective chart audit of AI patients that had undergone CABG surgery at Sanford Health Fargo. Statistical analysis of the data used frequencies of medications prescribed at discharge to identify inconsistencies in prescriber practice. The results demonstrated that AIs were prescribed ACCF/AHA guideline-directed medical therapy at their discharge. The prescribed medication included beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, or angiotensin II receptor blockers (ARB's), statin therapy, and antiplatelet (aspirin) therapy at discharge.

Objective Two

Objective two examined provider treatment plans between AI and non-AIs post CABG using the retrospective chart audit of both AI and non-AI that had CABG at Sanford Health Fargo; Chi-square tests were conducted on the medication therapies prescribed at discharge for AI and non-AI post-CABG patients. The results of the data chi-square test for beta-blockers was $\chi^2=4.326$, $df=1$, $p=0.038$; ACE inhibitor/ARB was $\chi^2=2.856$, $df=1$, $p=0.091$; statin therapy was $\chi^2=2.515$, $df=1$, $p=0.113$; and aspirin therapy was $\chi^2=0.0032$, $df=1$, $p=0.955$. The results of the data collected displays that AIs and non-AI patients were prescribed ACCF/AHA guideline-directed medical therapy at discharge including beta-blockers, angiotensin-converting enzyme

(ACE) inhibitors or angiotensin II receptor blockers (ARB's), statin therapy, and antiplatelet (aspirin) therapy. The results comparing AI and non-AI post-CABG discharge medications are shown in Figure 2.

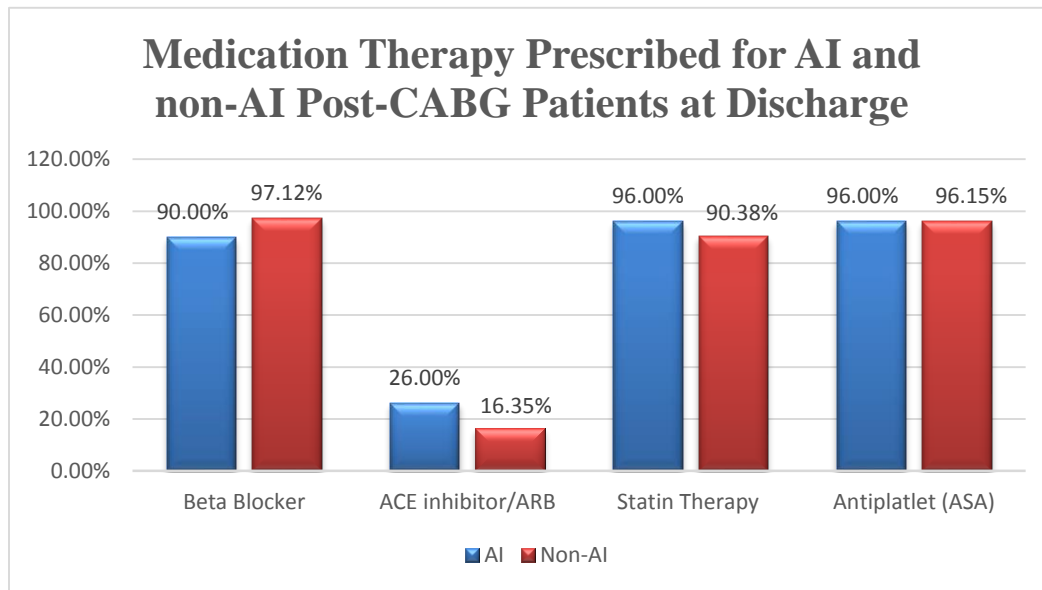


Figure 2. Medication Therapy Prescribed for AI and non-AI Post-CABG Patients at Hospital Discharge

Objective Three

Objective three determined patient adherence to the prescribed discharge treatment plan in the AI following CABG surgery at Sanford Health Fargo. Data collected were used for statistical analysis to determine if AI patients adhered to the recommended discharge treatment plans regarding follow-up medical appointments. Statistical analysis of the data used frequencies to determine their adherence to prescribed discharge treatment plans. The results of this project demonstrated AI patients were seen for follow-up care by a primary care provider (18%), cardiology (44%), and by cardiovascular surgery (95%).

Objective Four

In objective four the prescribed discharge treatment post-CABG surgery for AI and non-AI were compared. Data was collected using the retrospective chart audit of 204 medical

records; 100 AI and 104 non-AI charts. Chi-square tests were conducted on the data collected regarding discharge medical follow-up in both AI and non-AI patients. The results of the data chi-square tests for follow-up appointments with cardiovascular surgery $\chi^2=0.606$, $df=1$, $p=0.437$; cardiology $\chi^2=0.991$, $df=1$, $p=0.320$; and a primary care provider $\chi^2=20.753$, $df=1$, $p<0.0001$. The results of the data showed statistical significance for AI patients compared to non-AI patients who saw a primary care provider following discharge; 18% of AI patients attended an appointment with their PCP compared to 48.08 % of non-AI patients. The results of the data for the discharge medical follow-up appointments for AI and non-AI post-CABG are displayed in Figure 3.

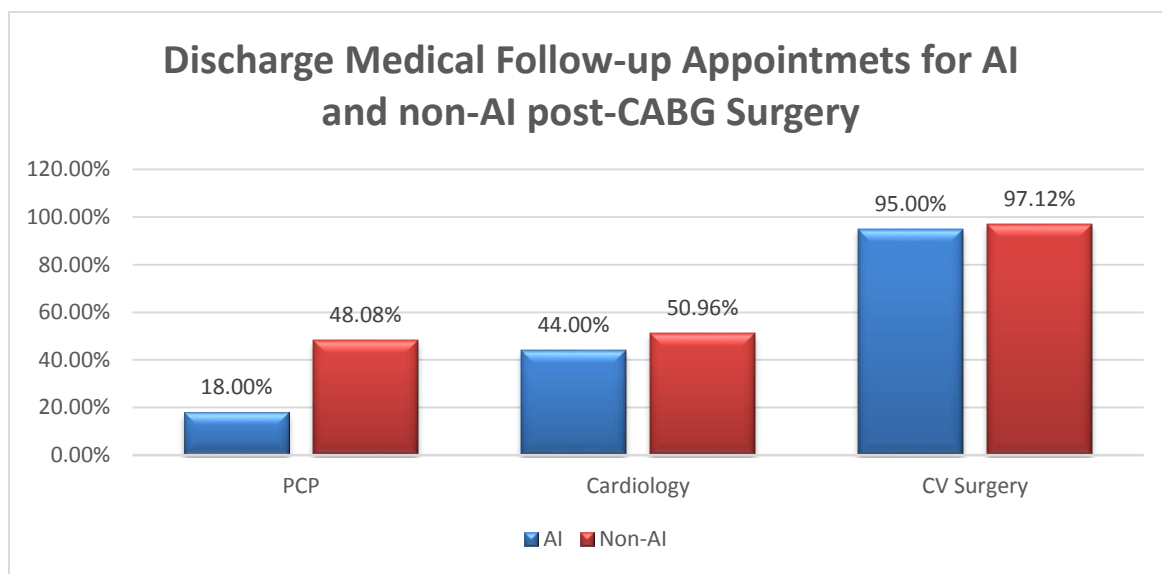


Figure 3. Discharge Medical Follow-up Appointments for AI and Non-AI Patients Post-CABG Surgery

CHAPTER SIX. DISCUSSION AND RECOMMENDATIONS

Interpretation of Results

In this retrospective chart review, demographical data was presented on post-CABG patients (n=204) which consisted of AI patients (n=100) and non-AI patients (n=104). In a study conducted by Dyke et al., (2013) AIs were younger at time of surgery compared to non-AI patients. Consistent with Dyke et al. (2013) the AI patients in this study were also younger at the time of surgery (63.1 years vs 64.1 years). Additionally, more AI males than females required CABG in this review (n=61). Obesity is a known risk factor for coronary heart disease. In a study by Gray et al. (2000), more than 75% of middle-aged and older AI men and women are overweight. When compared to previous studies, the findings from this study are similar. AI patients had an average body mass index (BMI) of 31.8 in contrast, to the non-AI patients who had a BMI of 31.3; a BMI greater than 30 is classified

In previous studies, AIs have been found to be a high-risk population for cardiovascular disease due to the high rates of diabetes mellitus, obesity, hypertension, and tobacco use (Jernigan et al., 2010; Kurian & Cardarelli, 2007; Sequist, Zaslavsky, Galloway, & Ayanian, 2006). In support of these previous studies, the findings of this study confirmed, that AIs have higher rates of diabetes (60% vs. 38.5% non-AI). Additionally, active tobacco use in AI patients was two times that of non-AI patients (56% vs 27.9%). Tobacco use has been associated with chronic lung disease. The results of this study looked at current tobacco use, and the presence of chronic lung disease. The results may not give a true representation of the population since AI patients presented to the hospital at a younger age and the effects of tobacco on their lungs may not be detected to this point. When age groups of 70 years old and above are incorporated in with chronic lung disease, the non-AI patients have almost a 2:1 ration (19 vs 32) when

compared to AI patients. The AI patients had a greater prevalence of moderate and severe lung disease when compared to non-AI (45.8% vs 35.6%). In contrast to previous reports, AI patients had decreased rates of hypertension when compared to non-AIs (83% vs 88.5%), and non-AI patients had reported greater incidents of cardiovascular disease when compared to AI patients (44.2% vs 14%). In a study by Dyke et al. (2013), AI patients present to the hospital with a higher level of acuity than non-AI patients present, and were more likely to require urgent or emergent revascularization, placing them in a high-risk category for surgery. In support of previous studies, the findings of this project confirmed that AI patients presented more acutely ill. For example, AI patients presented to the hospital with an ST elevated myocardial infarction (STEMI) three times more often than the non-AI patients (12 vs 3). In contrast, non-AI patients reported to the hospital with stable angina three times more often than AI patients (22 vs 7). Six AI patients presented to the hospital without symptoms compared to none of the non-AI patients (6 vs 0); correlation could be made that this presentation is related to silent myocardial ischemia. Hernandez et al. (2011) reported that coronary artery disease is often asymptomatic in diabetic patients and silent myocardial ischemia is predictive of cardiovascular mortality. The findings of this study supported Dyke et al. findings that AI patients require surgical revascularization more urgently. American Indian patients presented to the hospital and underwent urgent CABG more frequently than non-AI patients (70 vs 45). In contrast, non-AI patients had elective CABG surgery at rates greater than AI patients (31 vs 12).

The data collected regarding current ACCF/AHA Guideline for CABG surgery for guideline-directed medical therapy which included prescribing beta-blockers, angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARB's), high intensity statin therapy, and antiplatelet (aspirin) therapy at discharge was reviewed during the

retrospective chart audit. Despite the ACCF/AHA guideline, AI patients were less likely to be discharged on beta-blockers (90.0% vs 97.12%; $p<0.0375$) when compared to non-AI patient. Another key point was the prescribing of ACE inhibitors or ARB's upon discharge in both populations (26% AI and 16.35% non-AI) was problematic.

Patient adherence to the prescribed discharge treatment plan requires patients to return for routine outpatient appointments post-CABG. The results of data collection regarding patient adherence to the prescribed discharge treatment plan in the AI patents post-CABG revealed AI patients had significant deficiencies in areas of follow-up care. American Indian patients follow-up rate with a primary care provider after discharge post-CABG was only 18% of the time compared to an approximate 48% of the time for non-AI patients. American Indians patients were seen for return outpatient appointments by cardiology 44% compared to 51% for non-AI patients, and AI patients returned to the clinic 95% compared to 97% for non-AI patients to see the cardiothoracic surgeon. Optimal medical therapy and improved outpatient care remains vitally important in these high-risk patients and opportunities to improve medical care exist for AI now and in the future.

Limitations

The practice improvement project was associated with a number of limitations. The first limitation was this retrospective study included patients from 2008-2013; the current EBP guideline are the ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery and was used as the gold standard for this project (Hillis et al. 2011). The investigator decided not to use the previously published guideline by Eagle et al. (2004) because it did not address the use of pre or post-operative use of beta-blockers, or ACE inhibitors/ARB's however, it did recommend aspirin as the drug of choice for prophylaxis against early saphenous graft thrombotic closure and should

be considered a standard of care for the first postoperative year. All patients should be considered candidates for pharmacological low-density lipoprotein reduction post-CABG surgery if their low-density lipoprotein level exceeds 100 mg/dL (Eagle et al. 2004).

A second limitation to this project was the sample size. The total sample for this project was 204 patients. As stated earlier, 100 patients were identified as AI, and 104 patients were identified as a race other than AI. The number and selection of the patients may characterize the quality of a sample. A large matched sample size can be more representative of the population, limiting the influence of outliers or extreme observations. For this project, the 100 AI charts encompassed the total number of AI that had undergone CABG at Sanford Health Fargo for the years 2008-2013. A 1:1 match of post-CABG surgery patients was completed using the non-AI population for a representation of the total population involved in the previous study by Dyke et al. (2013), the difference in sample 100 vs 104 was two patients initially placed in the AI patient data did not meet the criteria and were moved to the non-AI group.

A third limitation of this practice improvement project may be multifactorial because providers at Sanford Health Fargo are provided discharge order sets within the EMR that meet the 2011 ACCF/AHA Guideline for patients following CABG surgery. However, this guideline has not been followed in a majority of cases for both AI and non-AI patients concerning the use of guideline-directed medical therapy. Despite algorithm-driven protocols set through the EMR, both AI and non-AI patients are not prescribed medications proven to decrease morbidity and mortality at time of discharge or in the immediate postoperative period. Additionally, Sanford Health Fargo does not have guideline in place for cardiovascular surgeons that provided clear direction for scheduling post-CABG patients return outpatient appointments. The importance of

optimal medical therapy and improved outpatient care remains necessary for positive outcomes not only in AIs, but also in all patients.

The fourth limitation was the inability to gain access and approval through IHS to view medical records for continued medication therapy and return outpatient appointments with their primary care provider. The restriction to IHS patient records limits the ability to conduct practice improvement projects that study if AI patients received follow-up care and if the provider followed current 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery when providing services. Additionally, the restriction limits the access to care along with the level of care provided which may or may not lead to increased mortality in AI patient's post-CABG.

The final limitation was the inability to access data electronically through a query. Data collection by human investigators can be the subject of errors. With the use of an electronic data query, errors in data collection are minimized. In addition, electronic data collection would have allowed for increased matching of patient variables including smoking, diabetes, and lung disease. The increase in variables will reduce the potential for the occurrence and effect of confounding factors.

Recommendations

Overall, several areas for improvement in care were identified in this project. A logical recommendation for collaboration would be to partner with the IHS facilities in the region. A collaborative relationship with IHS healthcare providers significantly affects the health of AIs. This collaboration would open the door for future projects, which can positively impact future generations. Additionally, the collaboration could be a building block to a much larger and more beneficial partnership between health care providers and IHS, to look for ways to improve

outpatient care and the management of comorbid conditions that have been proven to significantly increase mortality rates. With greater ease of access, patients could benefit from specialty providers such as cardiology, endocrinology, and nephrology while building a trusting relationship between the AI people and western medicine providers.

Secondly, there needs to be implementation of a CABG patient discharge algorithm (appendix D) to guide providers in the management of these patients to ensure better access to needed medical follow-up and available programs necessary to reduce the cardiovascular risk factors in CABG patients. The algorithm guides providers in the medical management of patients to optimize medical therapies essential in high-risk patients using the current 2011 ACCF/AHA guideline. Additionally, the algorithm includes long-term guideline medical therapy for secondary prevention of coronary artery disease, utilization of cardiac rehabilitation programs, smoking cessation, management of comorbid conditions including diabetes mellitus, hypertension, and obesity. Hillis et al.'s 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guideline continues to be the gold standard that this project was focused on achieving. Kulik et al. (2015) reported the importance for healthcare providers to implement these recommendations in appropriate CABG surgery patients as well as the importance of healthcare systems to support this implementation to maximize the benefit to the patient. The current guideline recommendations include:

1. Antiplatelet Therapy: Aspirin 81-325 mg should be administered preoperatively and within 6 hours after CABG. It should be continued indefinitely.
2. Lipid Management: Unless contraindicated, all CABG patients should receive statin therapy, starting preoperatively and restarted early after surgery.

3. Beta-Blocker Therapy: All CABG patients should be prescribed perioperative Beta-blockers ideally starting before surgery. CABG patients with a history of MI or LV dysfunction should be prescribed beta-blocker therapy unless contraindicated.
4. Hypertension Management:
 - a. Beta-blockers should be administered as soon as possible after CABG to reduce postoperative atrial fibrillation, and facilitate blood pressure control.
 - b. ACE inhibitor therapy should be administered after CABG for patients with recent MI's, LV dysfunction, diabetes mellitus, and chronic kidney disease, with careful consideration of renal function. Routine ACE inhibitor therapy is not recommended early after CABG among patients do not have a history of recent MI's, LV dysfunction, diabetes mellitus, and chronic kidney disease because of the risk of more harm than benefit.
 - c. It is reasonable to add calcium channel blocker or a diuretic agent as an additional therapeutic choice if not well controlled (Hillis et al. 2011).

A third recommendation following this practice improvement project would be to develop a standardized order set for the purpose of scheduling postoperative office visits. American Indian patients had a higher prevalence of comorbid conditions so aggressive management of diabetes and other co-morbidities, as well as smoking cessation, is needed to reduce morbidity and mortality. The lack of directed medical follow-up, and access to appropriate care, may be contributing to the disparity and increasing the mortality in the AI population. Based on the evidence, an algorithm (Appendix D) was developed in collaboration with cardiothoracic surgery at Sanford Health Fargo in order to better manage post CABG

patients ensuring better access to needed medical follow-up and available programs necessary to reduce the cardiovascular risk factors in CABG patients.

The current practice for most cardiothoracic surgeons is to schedule office visits for post-CABG patients between two and four weeks post discharge. They request patients be seen by the cardiology at an interval of six to eight weeks following discharge and post-CABG patients are told to see their PCP in one week. The recommendation of this project is to revisit with the cardiothoracic surgeon at frequent intervals up to the one-year mark post discharge. That would equate to approximately five visits the first year (2 weeks, 1 month, 3 months, 6 months, and 1 year). Post-CABG patients need to be scheduled with cardiology physicians at regular intervals similar to cardiothoracic surgeon. It is recommended that the patients be seen four times the first year (1, 3, 6 months and at 1 year), and then at least yearly. Post-CABG patient visits should be scheduled regularly as needed with by the PCP's of their choice. It was recommended these follow-up appointments be scheduled within the first week following discharge, then at a minimum of every three months for the first year. However, post-CABG patients with high incidents of modifiable risk factors should be seen at more frequent intervals (1 week, 3 week, 2 months, 3 months, 6 months, and 1 year). The need for follow-up with the patient's PCP is vital to the overall outcome and reduction of comorbid conditions.

The need to ensure post-CABG patients have an established PCP or a PCP prior to discharge is imperative to positive outcomes. Kulik et al. (2015) reported for patients who have undergone CABG, when secondary prevention goals are not met at one year, the incidence of adverse cardiovascular events increase, regardless of the number of risk factors present. Allowing the patient to establish care in the community helps to minimize the barriers that may exist in the adoption of preventative therapies. When looking at the SEM, we must empower the

individual and the family in order to make change. The SEM is individual focused and if we can help create personal change, and change within an organization, the situation encourages the community to adapt through prevention programs such as cardiac rehabilitation, and smoking cessation.

Implications for Practice

This practice improvement project provides insight into the use of the current EBP guideline for AI patient's post-CABG surgery and post-operative follow-up care. American Indians continue to be at high risk for cardiovascular disease and the risk factors associated with the disease. To maximize patient benefit, efforts are needed in both secondary prevention and tertiary care, as primary prevention efforts at this point have been unsuccessful. The need for collaboration between multiple disciplines across a wide spectrum of practice areas can prove to be problematic. The CABG Patient Discharge Algorithm (appendix D) that was developed for this project establishes a form of communication between the cardiothoracic surgeon, cardiology, and the PCP. This project is important because it raises awareness regarding the known disparities in AI health care, and provides an algorithm for providers to ensure all avenues of care have been addressed and secondary measures of health prevention are implemented.

This project can have its greatest effects on the AI population if a strong partnership between Sanford Health and Indian Health Services was implemented so there were outreach medical visits to IHS along with increased communication between cardiothoracic surgeons, cardiologists, and PCP's. This partnership could lead to changes in current practice and provide greater access to specialized medical providers to reduce disparities in this population. The importance in using current evidenced-based guideline has been well documented. The

significance of these guideline in the treatment of all patients with a history of CAD, regardless of race is to reduce the overall morbidity and mortality associated with coronary artery disease.

The results of this project were disseminated to cardiothoracic surgeons and other healthcare professionals at Sanford Health Fargo. Additional plans to disseminate the findings of this project will be at NDSU's third annual DNP and master's poster presentation, also at the 2015 American Indigenous Research Conference in Pablo, Montana October 2015, as well as Encompassing American Indian Culture into Healthcare Conference, Fargo, North Dakota May 2015. Dissemination will also be accomplished by collaborating with Dr. Dyke in the writing and publishing a manuscript as well as planning future projects regarding AI patients and cardiovascular disease to incorporate current findings in upcoming studies.

Healthcare providers working in a rural or in primary care settings are trusted with caring for individuals across the lifespan of different racial and ethnic backgrounds. This project was designed to provide up to date guideline directed medical therapies in attempt to educate providers as well as the community to decrease the morbidity related to cardiovascular disease. This project enables providers to be leaders in healthcare policy as well as to educate the individual, family, the community and the organization.

Implications for Future Practice Improvement Projects

The need for continued study of the current problem is recommended. If interested graduate students and researchers continue this project, one recommendation is to establish a partnership with IHS and complete the IHS IRB packet to gain access and approval for the studies. This approval would need to be established early in the design process to thoroughly investigate follow-up medical care via chart audit or other appropriate methodologies. This valuable partnership would enhance providers' ability to provide education and care of AIs

following CABG and important secondary preventative measures. The result of this project has set the groundwork for future studies in the reduction of mortality in AIs from coronary artery disease. Dr. Dyke, Cardiothoracic surgeon at Sanford Health, reviewed this project. The results are promising, with strong potential to affect the care of AI patient. Future studies are being considered and are in the planning stages.

Additionally, future research could include collaborating with traditional community-based healers and practitioners; this may be an important link to the outpatient care setting to ensure optimal care and improve mortality after surgery. Providing care in the community may require collaboration with a cultural liaison that is well respected in the community. This individual would assist in the education and teaching of community members, patients, and elders. The use of a well-respected community liaison or traditional healer gives validation to the teaching as well as builds rapport and a trusting relationship. Recognition of these issues presents an opportunity for continued improvement of care of the cardiac surgical patient both in the tertiary care setting and in the AI community.

Application to Other DNP Roles

The health disparities among American Indians, and other ethnic minorities, have been recognized and well documented. The results of this project allow nurse practitioners and other providers to serve as leaders in the implementation of current evidenced based practice guideline in reducing mortality related to cardiovascular disease in all populations. Nurse practitioners as well as other providers need to remain updated on current EBP guideline to ensure the best outcomes all patient populations.

The role of the nurse practitioner to implement policy change within an organization is paramount to the successful of this project. Nurse practitioners working in a rural setting are

typically caring for a vast number of patients and can have the most impact in follow-up care of patient's post-CABG surgery. The ability to educate patients on secondary prevention of disease, while using EPB guideline in the treatment of the disease will be beneficial. The nurse practitioner may also be able to influence the community through educational classes, health workshops, and collaboration with community leaders as well as other health care professionals. Ultimately, nurse practitioners have the ability and the responsibility to provide high quality competent care aimed at decreasing the burden of coronary artery disease experienced in the American Indian population.

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APPENDIX A. 2011 ACCF/AHA GUIDELINE FOR CORONARY ARTERY BYPASS SURGERY

Perioperative Beta-blockers: Recommendations

Class I

- 1- Beta-blockers should be administered for at least 24 hours before CABG to all patients without contraindications to reduce the incidence or clinical sequelae of postoperative AF. (*Level of Evidence: B*)
- 2- Beta-blockers should be reinstituted as soon as possible after CABG in all patients without contraindications to reduce the incidence or clinical sequelae of AF. (*Level of Evidence: B*)
- 3- Beta-blockers should be prescribed to all CABG patients without contraindications at the time of hospital discharge. (*Level of Evidence: C*)

Class IIa

- 1- Preoperative use of beta-blockers in patients without contraindications, particularly in those with an LVEF greater than 30%, can be effective in reducing the risk of in-hospital mortality. (*Level of Evidence: B*)
- 2- Beta-blockers can be effective in reducing the incidence of perioperative myocardial ischemia. (*Level of Evidence: B*)
- 3- Intravenous administration of beta-blockers in clinically stable patients unable to take oral medications is reasonable in the early postoperative period. (*Level of Evidence: B*)

Class IIb

- 1- The effectiveness of preoperative beta-blockers in reducing in-hospital mortality rate in patients with LVEF less than 30% is uncertain. (*Level of Evidence: B*)

ACE Inhibitors/ARBs: Recommendations

Class I

- 1- ACE inhibitors and ARBs given before CABG should be reinstituted postoperatively once the patient is stable, unless contraindicated. (*Level of Evidence: B*)
- 2- ACE inhibitors or ARBs should be initiated postoperatively and continued indefinitely in CABG patients who were not receiving them preoperatively, who are stable, and who have an LVEF less than or equal to 40%, hypertension, diabetes mellitus, or CKD, unless contraindicated. (*Level of Evidence: A*)

Class IIa

- 1- It is reasonable to initiate ACE inhibitors or ARBs postoperatively and to continue them indefinitely in all CABG patients who were not receiving them preoperatively and are considered to be at low risk (i.e., those with a normal LVEF in whom cardiovascular risk factors are well controlled), unless contraindicated. (*Level of Evidence: B*)

Class IIb

- 1- The safety of the preoperative administration of ACE inhibitors or ARBs in patients on chronic therapy is uncertain. (*Level of Evidence: B*)
- 2- The safety of initiating ACE inhibitors or ARBs before hospital discharge is not well established. (*Level of Evidence: B*)

Postoperative Antiplatelet Therapy: Recommendations

Class I

- If aspirin (100 mg to 325 mg daily) was not initiated preoperatively, it should be initiated within 6 hours postoperatively and then continued indefinitely to reduce the occurrence of SVG closure and adverse cardiovascular events (*Level of Evidence: A*)

Class IIa

- For patients undergoing CABG, clopidogrel 75 mg daily is a reasonable alternative in patients who are intolerant of or allergic to aspirin. (*Level of Evidence: C*)

Management of Hyperlipidemia: Recommendations

Class I

- 1- All patients undergoing CABG should receive statin therapy, unless contraindicated. (*Level of Evidence: A*)
- 2- In patients undergoing CABG, an adequate dose of statin should be used to reduce LDL cholesterol to less than 100 mg/dL and to achieve at least a 30% lowering of LDL cholesterol (*Level of Evidence: C*)

Class IIa

- 1- In patients undergoing CABG, it is reasonable to treat with statin therapy to lower the LDL cholesterol to less than 70 mg/dL in very high-risk* patients. (*Level of Evidence: C*)

* **Presence of established cardiovascular disease plus 1) multiple major risk factors (especially diabetes), 2) severe and poorly controlled risk factors (especially continued cigarette smoking), 3) multiple risk factors of the metabolic syndrome (especially high*

triglycerides ≥ 200 mg/dL plus non-high-density lipoprotein cholesterol ≥ 130 mg/dL with low high-density lipoprotein cholesterol [< 40 mg/dL]), and 4) acute coronary syndromes.

- 2- For patients undergoing urgent or emergency CABG who are not taking a statin, it is reasonable to initiate high-dose statin therapy immediately. (*Level of Evidence: C*)

Class III: Harm

- 1- Discontinuation of statin or other dyslipidemic therapy is not recommended before or after CABG in patients without adverse reactions to therapy. (*Level of Evidence: B*)

APPENDIX B. RETROSPECTIVE CHART AUDIT TOOL

Retrospective Chart Audit Tool

Date Collected ____/____/____

Random # _____ - _____

Surgical Provider: _____

Insurance:

____ IHS

____ Commercial Insurance

Medication Allergies:

Environmental / Latex Allergies:

1.

1.

2.

2.

3.

3.

4.

4.

5.

5.

Demographics:

Age: _____

Gender: M / F

Race/Ethnicity: AI / Non-AI

City: _____ State: _____

Body Mass Index: _____

Underweight (<18.5) Normal (18.5-24.9)

Overweight (25.0-29.9) Obese I (30.0-34.9)

Obese II (35.0-39.9) Morbid Obesity (40.0+)

Diabetes: Y / N

Diet Control

Oral Control

Insulin Control

Hypertension: Y / N

Current Smoker Y / N

Chronic Lung Disease:

Mild

Moderate

Severe

Pre-Op CHF: Y / N

PVD: Y / N

CVD: Y / N

Hx CVA: Y / N

Dialysis Dependent: Y / N

Creatinine (mg/dL): _____

Immunosuppressed: Y / N

Previous CABG: Y / N

Status:

Elective

Urgent

Emergent

Emergent Salvage

Presentation:

No Symptoms

Unlikely to be Ischemia

Stable Angina

Unstable angina

Non-STEMI

STEMI

Hx of MI

<7 Days Prior

8-21 Days Prior

>21 Days Prior

Cardiogenic Shock: Y / N

Arrhythmia: Y / N

Resuscitation: Y / N

Left main disease (>50%): Y / N

Ejection Fraction (%): _____

ADP Inhibitors: Y / N

Admission Date ____/____/____

Follow-up provider and appointment dates:

Surgery Date ____/____/____

PCP _____ ____/____/____

Discharge Date ____/____/____

Cardiology _____ ____/____/____

Discharge Vitals: BP ____/____, HR____ CV Surgery _____ ____/____/____

Discharge Medications:

Follow-up medication changes

Y / N Beta-blocker -Dose_____

1.

Y /N ACE-Inhibitor/ARB -Dose _____

2.

Y / N Lipid-lowering agent- Dose _____

3.

Y / N Aspirin – Dose _____

4.

Notes:

APPENDIX C. INSTITUTIONAL REVIEW BOARD APPROVAL



July 1, 2014

Dr. Loretta Heuer
Nursing

Re: Acceptance of Sanford Health IRB determination for:

Project Number: 03-13-033 "Outcomes of Coronary Artery Bypass Grafting in Native Americans"

NDSU Protocol #PH14304

Co- investigators: James Upton, Dr. Cornelius Dyke (Sanford Health)

Study site(s): Sanford Health Funding: N/A

The NDSU IRB accepts the determination of the Sanford Health IRB that the project above qualifies for exempt status (category # 4) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the protocol submission and approval letter from the Sanford Health IRB, dated -- April 1, 2013.

Please also note the following:

- This determination of exemption expires 3 years from this date. If you wish to continue the research after June 30, 2017, submit a request for recertification several weeks prior to this date.
- The project must be conducted as described in the approved protocol. If you wish to make changes, approval is to be obtained from the IRB prior to implementation, unless the changes are necessary to eliminate an apparent immediate hazard to subjects.
- Prompt, written notification must be made to the IRB of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Any significant new findings that may affect the risks and benefits to participation will be reported in writing to the participants and the IRB.

Thank you for complying with NDSU IRB procedures; best wishes for success with your project.

Sincerely,

Kristy Shirley

Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU, email=shirley.kristy@ndsu.edu, c=US
Date: 2014.05.01 09:17:11 -0500

Kristy Shirley, CIP
Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult www.ndsu.edu/irb. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

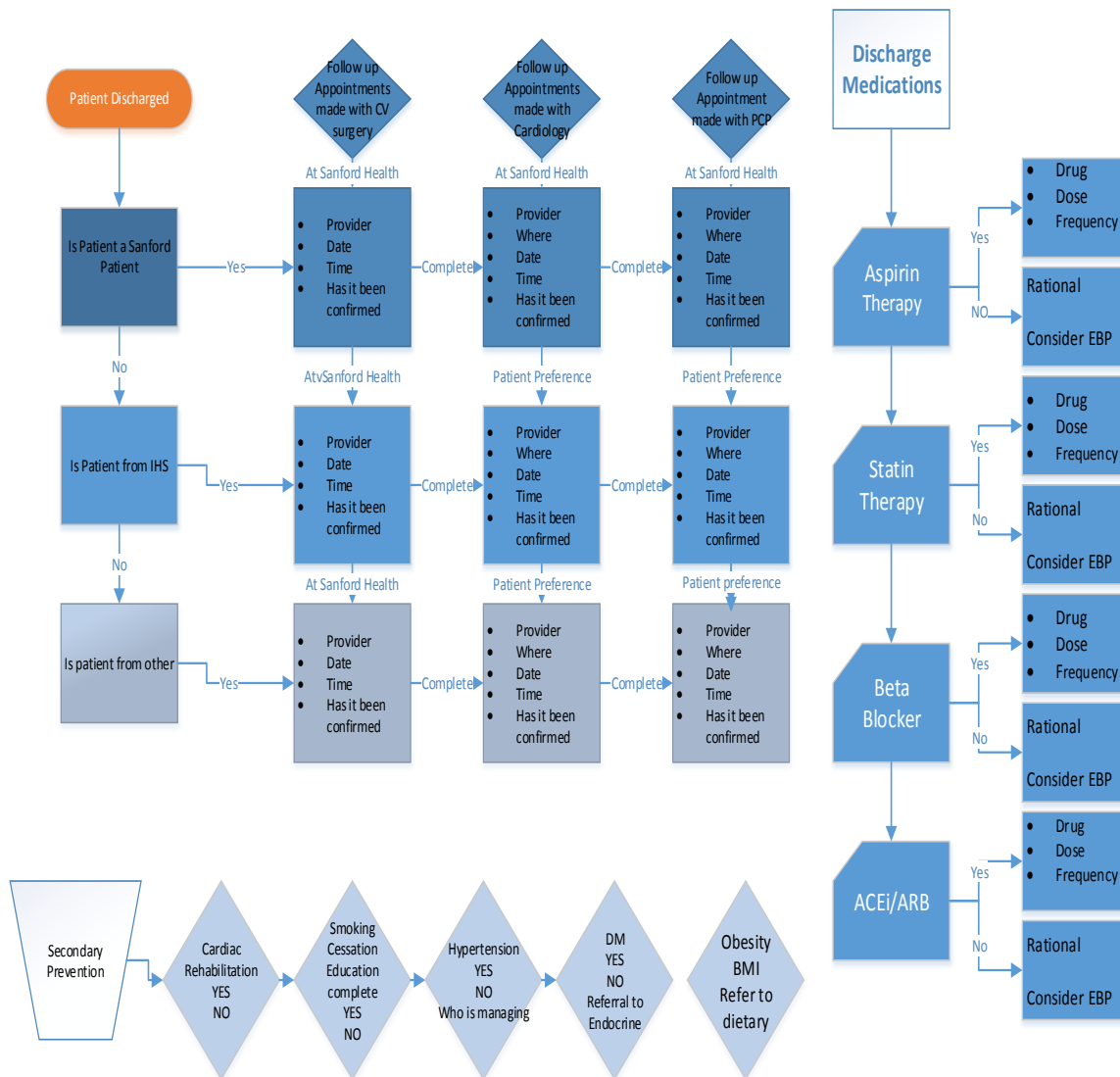
INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

NDSU is an EO/AAA university.

APPENDIX D. CABG PATIENT DISCHARGE ALGORITHM



Discharge CABG patient
EBP algorithm

APPENDIX E. SANFORD HEALTH LETTER

Sanford Heart Center
Cardiovascular Surgery
801 Broadway N
PO Box 2010
Fargo, ND 58122
(701) 234-2000
sanfordhealth.org



March 5, 2015

North Dakota State University
School of Nursing

Dear Committee Member:

I have been working with James Upton RN as he completes his practice improvement project for his advanced nursing degree. His project, investigating disparities in care in the American Indian population after cardiac surgery, has documented several issues that I think are important in the care of our patients after surgery. I am particularly interested in disparities in postoperative medical therapy and prescriptions. Additionally, our department is interested in how patients are followed up after surgery. James's data has suggested that American Indian patients may not have adequate primary care or medical followup after surgery and that this lack of access to postoperative care may adversely impact our patients medium-term outcomes.

Accordingly, our department is focusing on the postoperative and outpatient care that our cardiac surgery patients receive as a means of improving outcomes. Our aim is to have all our cardiac surgery patients receive guideline-based care not only during surgery but in the outpatient, postoperative period as well. Our goal is to reduce disparities in care between groups of patients and to improve the care of all our patients. James's research was instrumental in developing our plan.

Sincerely,

A handwritten signature in black ink, appearing to read "C. Dyke", written over a horizontal line.

Cornelius Dyke, MD
Attending Cardiac Surgeon
Sanford Health Fargo

Our Mission:
Dedicated to the work of
health and healing

APPENDIX F. EXECUTIVE SUMMARY

Background

The burden of cardiovascular disease is rising in American Indians (AI). According to the Centers for Disease Control and Prevention (CDC, 2011), among racial/ethnic populations, coronary artery disease (CAD) prevalence was greatest among American Indians at 11.6%. American Indian's have also been reported to have greater risk factors, prevalence, and mortality rates for cardiovascular disease (CVD) compared to other races (Eschiti, 2005; Veazie et al. 2014), including diabetes mellitus, obesity, hypertension, and tobacco use (Kurian & Cardarelli, 2007; Roger et al., 2012).

Increased risk factors, not surprisingly, results in twice the numbers of cardiovascular events as compared to the non- AI population, in turn leading to higher mortality rates in this population. With respect to AIs undergoing surgical revascularization with coronary artery bypass grafting (CABG), mortality rates are reported to be higher than the general population and other ethnic groups (Nallamotheu et al., 2001). Understanding this disparity and identifying potential causes is needed to reduce health care disparities in AI following surgical coronary revascularization.

Project Summary

Based on the need to reduce mortality rates in AI following surgical coronary artery revascularization, a retrospective study of patients who had underwent coronary artery revascularization at Sanford Health, Fargo, North Dakota from the years 2008-2013. This retrospective study examined the medical records of 100 AI patients and 100 medical records of non-AI patients. Data collected included patient demographics, allergies, discharge medications, and follow-up care. This data was quantified to identify potential deficiencies in practice in

hopes of developing strategies for improving care. Current ACCF/AHA evidenced based guideline (Hillis et al., 2011) for management of patients following CABG was used as a basis for guideline-directed medical therapy on reducing the morbidity and mortality of patients following CABG.

Results

The data confirm that AIs are a high-risk population with significant risk factors for poor outcomes (diabetes, active tobacco use, and acute presentation) following CABG. However, data collected regarding the EBP for guideline-directed medical therapy to include prescribing of beta-blockers, angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARB's), high intensity statin therapy, and antiplatelet (aspirin) therapy (Table 2) at discharge was not significant to definitively pinpoint the cause of increased mortality in the AI populations.

The data collected supports the assumptions that adherence to and reduced access to care may potentially contribute to an increase in mortality in the AI population following CABG surgery. Data collected regarding medical follow-up (Table 3) represent the comparison of AI and non-AIs. This table clearly depicts a deficiency in follow-up care for AIs with a PCP and although not statistically significant, follow-up with cardiology was consistently below that of non-AI. The reason for this is likely to be multifactorial to include reduced access to health care, economical, and adherence to prescribed treatment plans. Overall, the results indicated a need for algorithm driven protocols, and the need for continued, frequent follow-up care is essential.

Recommendations

The results of the current project lead to several recommendations. The first would be to collaborate with the IHS facilities in the region. Healthcare providers working in IHS have an

opportunity to significantly impact the health of AIs. The collaboration could be a building block to a much larger and more beneficial partnership between health care providers and IHS, to look for ways to improve outpatient care and the management of comorbid conditions that have been proven to significantly increase mortality rates.

Secondly requires the implementation of CABG patient discharge algorithm (appendix E) to guide providers in the management of post CABG patients and to ensure better access to needed medical follow-up and available programs necessary to reduce the cardiovascular risk factors in CABG patients. The algorithm guides providers in the medical management of patients to optimize medical therapies essential in high-risk patients using the current EBP guideline.

Lastly, will be to develop a standardized order set for the purpose of scheduling postoperative office visits. AI patients had a higher prevalence of comorbid conditions and long-term, aggressive management of diabetes and other co-morbidities, as well as smoking cessation, is needed to reduce morbidity and mortality. The lack of directed medical follow-up, and access to appropriate care, individuals may be contributing to the disparity and increasing the mortality in the AI population.